

**Effects, adherence and therapists' perceptions of online- and mobile-supported group therapy for depression: Mixed methods study**

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## **Abstract**

**Background:** Blended group therapy (bGT) has been investigated a several times for anxiety and depression, but information on patient's adherence to and therapist's perception of the novel format is non-existent. Furthermore, many studies investigated mainly female and highly-educated populations, limiting validity of previous findings.

**Objective:** The study aims at reducing those gaps and limitations, by evaluating an integrated Internet- and mobile-supported bGT format.

**Methods:** Twenty-seven patients, diagnosed with major depression (48% male, compulsory education= 29.6%), participated in a seven-week treatment at a university outpatient clinic. Eight novice therapists participated in semi-structured interviews, and a subsequent cross-validation survey.

**Results:** Primary symptom reduction was high ( $d = 1.31 - 1.51$ ) and lasted for the follow-up period. Therapists identified advantages (e.g. patient engagement, treatment intensification, and improved therapeutic relation) and disadvantages (e.g. increased workload, data issues, and undesired effects) of bGT. Required therapist time was 10.3 minutes per patient and week, including guidance on exercises (67%) and intimate communication (33%). Concerning patients' adherence to bGT, tracked completion of all online- and mobile tasks was high (67 – 76%), and comparable to group attendance.

**Conclusion:** Results suggest high feasibility of bGT in a gender-balanced, moderately educated sample. bGT provides group therapists with tools for individual care, resulting in an optimization of the therapy process, and high completion rates of the implemented bGT elements. The limited work experience of the involved therapists restricts the study findings, and potential drawbacks need to be regarded in the development of future bGT interventions.

Keywords: Smartphone-supported intervention; monitoring; blended therapy; group therapy;  
computer-supported therapy

## Introduction

Depression is one of the most prevalent mental disorders and a leading cause of disability. It imposes suffering and high costs on individuals, societies and health systems [1]. In line with international research priorities [2,3], different forms of mobile- and internet-based interventions constitute innovative and efficient strategies, to deliver evidence-based psychological treatments for common mental health disorders [4-8].

Amongst their most frequent formats, mobile- and online interventions offer flexible and anonymous access to mental health services, resulting in low social barriers and low risk of stigmatization [9, 10]. Due to the high degree of automatization, those interventions guarantee standardized treatments to a highly scalable extent. These properties make them attractive for mental health care organizations and have led to the launch of the first routine online clinics [11-13].

However, online- and mobile-interventions also exhibit limitations as they do not meet all patients' needs and preferences, and therapist contact usually is restricted to a wide degree. Furthermore, therapeutic guidance frequently is associated with better treatment outcomes and reduced dropout rates [14, 15]. Lastly, many therapists lack experience with this novel approach and hold more cautious attitudes towards online interventions [16]. Comparable levels of caution and awareness have been found amongst different interest parties (e.g. mental health care providers and policy makers), contributing to a frequently discussed retardation of dissemination efforts [17]. Therefore, it is crucial to gain further insight into therapists' perception and acceptance of technology-aided treatments.

The techniques developed in the field of online therapy [7,18-21] can also be harnessed to improve existing forms of face-to-face therapy, resulting in a continuum of blended treatments (*Figure 1*). Within blended interventions (syn. computer-, or mobile-supported interventions) the spectrum of possible applications ranges from adjuncts to psychotherapy [22], which can

be applied prior, after or during treatment [23,24], to more integrated forms of therapy, in which online- or mobile-elements and personal sessions are more deeply intertwined into one treatment rationale [25-27]. A growing number of studies shows that blended interventions can lead to shortened treatments, in which less therapist time is needed to achieve substantial effects [23,26,28]. Simultaneously, online- or mobile-elements can be deployed in order to optimize the therapeutic process, to foster transfer, and to boost effects of classical treatments. In this regard, first studies in routine care found additive effects of traditional face-to-face therapy augmented with online therapy elements [29,30].

\*\*\*\*\* Figure 1 about here \*\*\*\*\*

According to therapists, patients can profit from blended interventions in form of increased treatment accessibility and flexibility, as well as from the improvement of patients' self-management and the optimal use of face-to-face sessions [31,32]. Additionally, mental health care providers, policy makers and other such organisations seem to have a more positive conception of blended therapy compared to pure online therapy [17], and therapists seem to prefer the blended format because it is associated with less risks (e.g. diagnostic process) [16]. Amongst the potential disadvantages of the integrated format, therapists frequently remark that blended therapy is not feasible for all patients, and that the format at times could hamper the therapeutic process – in particular the establishment of the therapeutic alliance [31,32]. Consequently, those issues should be investigated in more detail in patient- and therapist-related studies.

While most blended research focuses on individual therapy [23], less is known about its potential for group therapy. Psychological groups have a broad range of applications in in- and outpatient settings [33]; and the spectrum ranges from informational groups, over psychoeducational groups, to group counselling and group psychotherapy [34]. So far, the feasibility and effects of blended group therapy (bGT, syn. computer- or app-supported GT)

have been investigated in terms of brief interventions for depression and anxiety. For example, computer-based relaxation, cognitive restructuring and self-control desensitisation have been found to be supportive in the treatment of generalised anxiety disorder (GAD) [35]. Furthermore, first evidence for the efficiency of brief bGT for social anxiety disorder and GAD was found in small comparative trials, leading to significant symptom reductions in a comparably short time period [36, 37]. As for depression, several feasibility studies investigated the merits of supportive computer- and mobile-based elements. For example, a tablet-guided behavioural activation intervention was found to be feasible for the treatment of major depressive disorder [38]. In another study, Aguilera and colleagues found beneficial effects of group therapy augmented with monitoring and text messaging [39]. Furthermore, a brief resource-oriented bGT intervention was developed by our workgroup in order to address depression by means of a low-threshold, stigma-free treatment strategy. The results revealed high feasibility in terms of client satisfaction and observed between-group treatment effects. Moreover, assessed parameters of treatment adherence (e.g. self-reported exercising) indicated high acceptability of bGT elements [40-41]. In a subsequent qualitative investigation (including 13 patients of the present study), the use of technology was described as a therapeutic factor, facilitating insight, exercising and treatment transfer [42].

The present study wants to carry this work forward by investigating an integrated bGT intervention, based on Acceptance and Commitment Therapy principles [43], complemented with elements of Behavioural Activation [44]. As in previous studies, patients' self-reported depressiveness and general health, as well as ACT-specific variables and standardized measures for service satisfaction and usability were assessed. As literature on bGT for depression remains scarce, those outcomes are being provided. For the first time, log data were tracked to provide reliable information on completion rates of computer- and mobile-based elements. Focussing on the therapist-related feasibility of bGT, this study includes

therapist interviews and a subsequent follow-up survey. As a related aspect, the amount of weekly online guidance was recorded in order to ascertain therapists' between-session work load.

## **Methods**

### **Participants**

The trial was preregistered at the German trial register (DRKS-No.: DRKS00010888), and the regional ethics committee of the University of Salzburg approved the study procedure.

Participants were recruited via a multimodal recruitment strategy by handing out flyers in public health centres and densely populated public areas, and by advertisements on depression-related web pages (e.g. [www.depression.at](http://www.depression.at)). After registering on the study platform ([www.lets-act.at](http://www.lets-act.at)) participants obtained detailed information about the procedure and goals of the study, and were asked to give informed consent.

The selection of participants followed two steps. Participants were asked to fill out a short screening questionnaire. This included the short version of the Center of Epidemiologic Studies Depression Scale [45, 46] and additional questions regarding current and past psychological or medical treatment. Participants reporting at least mild levels of depression (CES-D > 17), and no suicidal ideation, critical drinking or past or recent history of severe psychiatric conditions were invited to take part in a diagnostic interview.

Personal clinical interviews were conducted by three independent and experienced psychologists, applying the German Mini-DIPS [47]. The Mini-DIPS is a 30 to 45-minute version of the German DIPS (Diagnostic Interview for Psychological Disorders; [48]), based on ICD-10 depression criteria. Participants were deemed eligible, if the following criteria applied: Age between 18 and 65, suffering from mild to moderate levels of major depression, and/or dysthymia; and/or mild to moderate comorbid anxiety, as well as familiarity with the

use of personal computers and possession of a smart phone. According to clinical judgement, participants were excluded if they suffered from severe depression (> 7 criteria, including main symptoms), severe anxiety disorder, bipolar disorder, any schizoaffective disorder, severe psychiatric and psychotic conditions, substance abuse, suicidal ideation, or if they exhibited low German-language and/or computer skills. Participants were also excluded if they currently underwent psychotherapy. Psychiatric medication was tolerated, but have been kept constant for at least three months prior to study onset. *Figure 2* presents the flowchart, demonstrating the recruitment and research procedure in detail.

\*\*\*\*\* Figure 2 about here \*\*\*\*\*

## **Procedure**

After pre-assessment, participants were provided with access to the internet platform (Minddistrict) and scheduled to one of two weekly groups, depending on personal preferences. In order to provide personal support in case of technical problems the app-based diary was installed at the end of the first group session. Group meetings lasted seven weeks and each session was preceded by a preparatory online module. Therapist gave supportive feedback after completion of a given online session, and occasionally gave reminders to participants by sending out prompts via the platform. The app-based diary complemented the blended treatment, with a focus on the transfer of previously learned techniques into daily life. Participants were free to logon to the platform after treatment had ended, but did no longer receive therapist guidance. As recommended by several guidelines (p. 372) [33], group sessions were held in a double trainer format which lasted 90 minutes each. One week after the last group session, the online post-assessment had to be filled out, and follow-up assessment took place three months later.



## Intervention

The seven weeks intense group treatment was based on ACT and BA principles. Acceptance and Commitment Therapy [43] is one of several new treatments originating from cognitive behavioural therapy (CBT). Important core principles of this contemporary approach can be divided into mindfulness and acceptance techniques (acceptance, cognitive defusion, self as context) and behaviour change techniques (contact with the present moment, values and committed action). Even though ACT and behavioural activation (BA) diverge regarding certain theoretical assumptions (i.e. proposed mechanisms of action) [49], they also share many communalities (e.g. clarification of goals, or strong emphasis on behavioural techniques). Therefore, ACT-based behaviour change techniques can be complemented by BA principles [50]. The current treatment rationale was recreated on the basis of a prior online intervention, merging ACT and BA into one integrated rationale [51]. Detailed information on intervention content and design can be obtained from *Table 1* and *Figure 3*.

\*\*\*\*\* Figure 3 about here \*\*\*\*\*

Regarding the use of computer- and mobile-based elements, the patients' weekly routine consisted of three steps. Firstly, a preparatory online module, featuring video clips, text-based tasks and an asynchronous therapist-chat, had to be completed. Afterwards, patients received individualized feedback from the assigned therapist (if applicable within two days). Secondly, patients participated in the weekly reunions, which again were partially complemented by modern media (i.e. short clips or PowerPoint presentations). As a last step, patients were guided by weekly mobile phone diary tasks, which were scheduled for seven days following the weekly group session. All reminders and prompts were modifiable according to personal preferences, and, wherever possible, therapists were instructed to balance media and personal treatment elements according to patient needs and their professional judgement. If patients did not adhere to the online tasks, therapists were instructed to send out a prompt at the mid of the

treatment-week, and again one the day before the forthcoming group session. If patients complained about the number of reminders, the prompts were reduced or stopped.

\*\*\*\*\* Table 1 about here \*\*\*\*\*

## **Therapists**

Eight novice therapists (2 male, 6 female) conducted the groups in a double trainer setting. Of the eight therapists, two finished their master's degree (M.Sc.) and/or PhD in psychology, and underwent tertiary training in psychotherapy (CBT), clinical psychology (CBT) or medicine at the time of the intervention. The remaining five therapists were in their final year of clinical psychology (M.Sc.), and had clinical experience with conducting classical forms of individual or group therapy, as well as with drafting psychological expert reports. None of the therapists had prior experience with conducting bGT or any other form of online therapy. Therefore, participating therapists underwent previous training (min. 40 hours), including a six-DVD ACT-series (ACT in Action) and two textbooks [52, 53] encompassing sections on difficult situations in ACT. Therapists also protocolled their weekly group sessions. Adherence to the foreseen treatment course was supported by in- and between-session media and technology elements. Of the eight therapists, two therapists participated in a previous bGT study [41], and six participated in the current study. At the time of the therapist interviews (3 to 12 months after study end) all except one therapist were in tertiary clinical trainings for psychotherapy (three therapists; CBT, client-centred therapy), clinical psychology (three therapists; CBT), or medicine (one therapist).

## **Outcome measures**

### **Primary Outcomes**

The principal outcome of the study was reduction of depressed mood. It was measured by the short version of the German translation of the CES-D, Center of Epidemiological Studies-Depression Scale [45, 46]. This questionnaire measures interactive, cognitive and somatic symptoms, as well as emotions and motor functions related to depression. The 16 items are rated on a 4-point Likert scale. Any value above 17 is interpreted as critical. The German version's critical threshold ( $>17$ ) has high discriminative validity, pointed out by a sensitivity of 90 %, a specificity of 87 % [45] and an AUC (area under the curve) value of 0.94 [54]. The reliability of the CES-D has been shown to be high [46]. Cronbach's alpha in the present study was .90.

As a more general self-report questionnaire, which measures psychological distress, non-specific current mental health and the risk of developing psychological disorders, the GHQ-12 (General Health Questionnaire; [55]) was used. The questionnaire has shown solid reliability [56] and good intercultural validity [57]. Cronbach's alpha in the present study was .84.

## **Secondary Outcomes**

Psychological flexibility (i.e. acceptance of unpleasant feelings, worry and control agendas) is the central psychological construct of ACT, and was measured by the FAH-2 (Fragebogen zu Akzeptanz und Handeln II) [58]. This is the German version of the Acceptance and Action Questionnaire-II (AAQ-II) by Bond and colleagues [59]. The seven items are rated on a 7-point Likert-scale. Cronbach's alpha of the present study was .89.

Anxiety was measured with the AnTi, the Anxious Thoughts Inventory [60] (German translation [61]). It analyses three dimensions of worry: social worry, physical health worry,

and meta-worry (worry about worries). The 22 items are rated on a 4-point Likert scale. Cronbach's alpha in the present study was .87.

Lastly, worry was measured with the PSWQ-3 [62], a short form of the Penn State Worry Questionnaire [63]. It is a questionnaire that assesses self-reported key aspects of worry in general anxiety disorder. The three items are rated on a 5-point Likert-scale. Cronbach's alpha in the present study was .74.

### **Client satisfaction and system usability**

System usability of applied app- and web-elements was measured by the SUS, the System Usability Scale [64]. The SUS is a robust questionnaire with 10 items rated on a 5-point Likert-scale. The sum score ranges from 1 to 100. SUS scores  $> 85.5$  classify excellent usability, scores  $\leq 85.5$  and  $> 71.4$  classify as good, scores  $\leq 71.4$  and  $> 50.9$  as OK, scores  $\leq 50.9$  and  $> 35.7$  as poor, and scores  $\leq 35.7$  and  $> 20.3$  as awful [65]. Cronbach's alpha in the present study was .78.

The ZUF-8 [66], the German version of the CSQ-8 [67], the Client Satisfaction Questionnaire, was used to assess several aspects of participants' overall treatment satisfaction. The 8 items are rated on a 4-point Likert-scale. The total score can range from 8 to 32, with a cut-off value of 24 [68] to grade a person as dissatisfied. Cronbach's alpha in the present study was .94.

### **Statistical analyses**

SPSS 24 was used to carry out the analyses. Significant differences between pre-, post and follow-up were analysed by linear mixed models (LMM), with compound symmetry as

covariance type and restricted maximum likelihood estimation (REML). Missing outcome values were analysed according to the intention to treat principle (ITT). Individual pre- to post changes served as a base for the reliable change indexes (RCI) [69]. As parameter for RCI reliability we used internal consistency [70]. The reliable change criteria were 5.87 scale points for the CES-D and 4.87 for the GHQ-12. For the assessment of change, within-group effect sizes were calculated with pooled standard deviation and reported in Cohen's  $d$  [71]. Power analysis was executed with G\*Power [72]. We assumed that the effect size for the secondary outcomes may only lie in the medium range. Thus, an estimated sample size of  $N = 22$  was calculated for a medium within-subjects effect size of  $d = 0.65$  (alpha-error  $\alpha = .05$ , power  $\beta = .90$ ).

### **Qualitative analyses**

Based on a structured interview guide (Appendix A), audio taped therapist interviews were conducted by the first author (RS). Interviews lasted between 28 – 56 minutes ( $M = 44$ ), and were transcribed by two independent psychologists, who also analysed the material obtained. MAXQDA was used to conduct the analysis. Analysts were blind to the outcomes and identity of participants. Qualitative content analysis [73] served as the method of information extraction, by applying a deductive extraction based on addressed research questions. After analysing 29 % of the transcript, both psychologists and the first author (RS) jointly revised the code system in order to reach agreement on the applied coding system. Principal codes closely related to the structured interview guide, which were then specified into furtherly emerging subthemes. After content analysis, a set of follow-up questions was surveyed anonymously, to depict the degree of consensus on particular findings amongst the interviewed therapists (*Table 5*). Of the 30 items, 10 items related to design aspects and will

be reported in a further publication on bGT design. The complete list of follow-up questions was translated by a bilingual psychologist and is presented in *Appendix B*.

## Results

### Participants

A comprehensive overview of participant characteristics at baseline is provided in *Table 2*.

Men and women were equally represented (female, 52 %), with a mean age of 37.7 years ( $SD = 13.7$ ), and relatively low levels of education and employment status (vocational school = 25.9 %; unemployed/partially employed = 40.7 %). One patient withdrew from treatment, resulting in a completion rate of 96 %. During the study period three patients reported changes in medication. According to ITT-principles, those patients remained in the analyses. Detailed information on participants' enrolment and participation throughout the study can be gained from *Figure 2*.

\*\*\*\*\* Table 2 about here \*\*\*\*\*

### Primary and secondary outcomes

Linear mixed models unveiled significant changes in all outcome measures, and pre- to post-effect sizes for primary outcomes were large to very large ( $d = 1.31 - 1.51$ ). The primary outcome CES-D showed a statistically significant decrease in self-reported depressiveness, with an F-value of  $F_{(2,43.323)} = 18.94$ ,  $p < .001$ . For the CES-D, 74 % of participants exhibited reliable change (RCI) from pre to post assessment (deteriorations = 3.7 %). Self-reported psychological distress, measured by the GHQ-12, decreased significantly,  $F_{(2,41.616)} = 12.04$ ,  $p < .001$  and reliable change (RCI) was found in 63 % of participants (deterioration = 0 %).

Estimated means, standard deviations, effect sizes and RCI of both scales are depicted in *Table 3*.

For applied secondary outcomes the treatment resulted in less pronounced effects ( $d = 0.38 - d = 0.71$ ). The Acceptance and Action Questionnaire (AAQ-II) revealed a significant change over time,  $F_{(2,39.710)} = 10.41, p < .001$ , and an effect size of  $d = 0.59$ . A comparable pattern was found regarding the Anxious Thoughts Inventory (AnTi),  $F_{(2,39.450)}, p < .001; d = 0.72$ ; and regarding the Penn State Worry Questionnaire (PSWQ-3),  $F_{(2,39.447)}, p < .001; d = 0.37$ . For further information on estimated means, standard deviations and effect sizes see *Table 3*.

\*\*\*\*\* Table 3 about here \*\*\*\*\*

### **Maintenance of treatment effects**

After a follow-up period of three months, the reduction of self-reported depression (CES-D) remained stable ( $F_{(1,23.556)} = 29.98, p < .001$ ), and 78% of participants exhibited reliable change (RCI) (deteriorations = 7.4 %). Regarding self-reported psychological distress (GHQ-12), participants showed a significant decrease from pre- to follow-up,  $F_{(1,22.758)} = 4.82, p = .039$ , and reliable change (RCI) was found in 52% of participants (deteriorations = 11.1 %).

Contrary to self-reported depressiveness, treatment effects on psychological distress regressed slightly during the follow-up period. However, these reductions failed to rise above the level of statistical significance ( $t_{(26)} = 1.39, p = .177$ ). Stable treatment effects also were found for the three secondary outcomes: psychological flexibility (AAQ-II),  $F_{(1,18.867)} = 12.59, p = .002$ ; anxious thoughts (AnTi),  $F_{(1,17.771)} = 12.04, p = .003$ , and worry (PSWQ-3),  $F_{(1,18.825)} = 4.60, p = .045$ . Further information can be obtained from *Table 3*.

### **Client satisfaction and system usability**

System usability of applied app- and web-elements, measured by the System Usability Scale (SUS) [64], unveiled an average system usability of 65.33 (SD = 18.95) of 100 possible scale

points. Accordingly, system usability can be classified as OK to good [65]. Participant's service satisfaction, measured by the ZUF-8 [66], assessed an average satisfaction of  $M = 26.43$  ( $SD = 4.80$ ) on a 32-point scale, indicating "good" client satisfaction. However, according to the weekly documentation of group sessions, group coherence in one group was low, and the group climate would have profited from including personality disorders (Cluster A and B) in the diagnostic procedure.

### **Intervention usage, and therapeutic guidance**

Usage of online components was high, with a completion rate of 76 % for online modules (cf. group attendance 82.4 %) and 67 % for the mobile-based diary app modules (*Figure 4a*). However, the average number of app entries during treatment ( $M = 33$ ) exhibited great variety (range = 0 – 246). The average time therapists spent in guiding of weekly online modules was  $M = 10.3$  minutes per patient, including guidance on accomplished exercises (67%) and lateral patient-therapist communication (33%). Thus, two thirds of the total guidance was dedicated to the supervision of online tasks, while intimate patient-to-therapist communication constituted the remaining third. There was a trend towards a reduction of guidance as the study progressed, and the single groups differed in the required guidance time.

\*\*\*\*\* Figure 4 about here \*\*\*\*\*

### **Therapist interviews and subsequent follow-up survey**

The therapists' experiences with and attitudes towards bGT can be described as cautiously positive to positive. Important themes concerned the functionality and applicability of bGT, patients' interaction with the format, as well as the general appraisal of bGT. *Table 4* depicts main themes, sub-themes, and frequently assigned codes of the interviews. With  $k = 0.49$  (Cohens' Kappa) interrater agreement was sufficiently high. Interview results were



subsequently validated by an anonymous follow-up survey which was based on the content of the interviews (*Table 5*).

\*\*\*\*\* Table 4 about here \*\*\*\*\*

In the wider perspective therapists agreed that bGT can have a positive impact on current forms of group therapy, and that they had more positive attitudes towards bGT after applying this format. Perceived merits of bGT were augmented monitoring, in addition to patients' responsiveness to given online reminders in terms of increased treatment adherence. Most therapists agreed that patients would profit from the technology-aided treatment transfer, and from the repeated presentation of therapy materials (platform, app, and group sessions). Furthermore they agreed, that online modules would prepare patients for subsequent group reunions. Six out of eight therapists reported that particular patients disclosed more openly via private online communication (online disinhibition effect), compared to the group meetings. Individual differences emerged in the preference of particular treatment elements. While some therapists emphasised the added value of between-session elements, others underpinned the merits of applied in-session tools.

\*\*\*\*\* Table 5 about here \*\*\*\*\*

Regarding the potential risks of bGT, a consensus emerged, that in-session media should be applied cautiously (e.g. overloaded sessions), and that the intervention at times might have hampered some of the desired group dynamics (e.g. too little time for discussions). In this context, the preservation of technology-free group sessions was suggested. Two therapists also advocated a cautious use of online reminders and prompts, in order to prevent less interested patients from feeling overwhelmed or discouraged. During the interview, one therapist expressed serious concerns about data safety.

## Discussion

The current study investigated the feasibility of a mobile- and web-supported blended group treatment (bGT) for depression, with a focus on therapists' perception of and patients' adherence to the novel format. High effects on self-reported depressiveness and general health, as well as beneficial effects on ACT-related secondary outcomes were observed. Effects remained stable over a short follow up period. Therapist interviews revealed high treatment applicability, and perceived benefits concerned treatment availability, monitoring and transfer, as well as the establishment of the therapeutic relation. On average therapists spent 10 minutes per patient per week with online guidance, with decreasing guidance over the course of time and variation between individual groups. Regarding patients' system usage, participants almost equally engaged in weekly group reunions and online tasks. Usage patterns of the mobile-based diary varied to some extent.

Applied primary outcome measures indicated substantial effects on self-reported depressiveness and general health after the outpatient treatment had ended. Observed effects correspond to earlier bGT depression studies [40, 41, 74], to benchmarking meta analyses on group therapy [75-77], and to recent group therapy trials in routine care [78, 79]. As guideline-based group CBT usually entails 15 – 20 hour sessions [33], high treatment effects where achieved in a comparably short period of time. Whilst most observed effects remained stable, self-reported general health decreased slightly but non-significantly at follow-up. To further increase treatment success, different forms of online aftercare [23, 24] could easily be integrated into bGT, and flexible care solutions, such as discontinuous groups, booster sessions or online groups [88, 89], can be facilitated by bGT. As a related aspect, long term effects of bGT need to be study in future trials.

This study adds a first therapist-related perspective to the growing evidence on bGT.

Retrospectively, novice therapists described the format as contemporary, featuring patient-

and therapist-related, as well as interactional advantages. They reported patients to engage intensely with the bGT tasks, leading patients to be well prepared for the next group session. Furthermore, they appreciated the format for providing flexible working hours, as well as information about the individual treatment progress. Even though not all therapists were initially fond of the novel format, personal experience increased the self-reported willingness to work with the novel approach [83, 84]. As for the perceived disadvantages, therapists mentioned the additional between-session workload, and some preferred a more classical format. In this context, some therapists stated that it might be difficult to attract experienced or less interested therapists, and that the treatment had a more training alike character. Furthermore, patients should not feel overwhelmed by the use of technology or the intensity of treatment (e.g. reminders).

Regarding the reported improvement of therapeutic alliance, the therapist-back end system allowed personalized feedback on completed tasks (two thirds of the time), as well as intimate lateral communication between therapists and clients (one third of the time). Interviewed therapists appreciated both functionalities, and, according to the therapists, patients responded to online prompts, resulting in an increased completion of outstanding therapy tasks. As a last consideration, all therapists that used software with implemented confidential communication (6 out of 8 therapists), reported that some of their patients disclosed more openly via intimate lateral communication. This phenomenon can be classified as a form of the online disinhibition effect [86]. In a previous study, the online disinhibition in bGT seemed to be fostered by the perceived intimacy between the patient and the therapist in the absence of an additional audience [42].

As another important feasibility criterion, the amount of additional workload due to online guidance is from particular relevance [85]. Beyond doubt, the time required by therapists depends on the implemented tasks of a given intervention. We found a moderate amount of

additional workload in an intervention designed to provide close between-session guidance. Most therapists expected further reductions of required guidance time with a growing routine in conducting bGT. Therapist support frequently is associated with improved treatment adherence and lower dropout rates [15]. Here, bGT can be a reasonable alternative to existing formats, such as online therapy or blended individual therapy.

Treatment flexibility is of particular interest in outpatient groups, as the scheduling of group sessions is usually restricted to evening hours on a specific weekday. On one hand, technology-induced treatment flexibility is appreciated by patients [32, 42]. On the other hand, more flexible working hours might also prove to be attractive for certain therapists. Here, increases in flexibility are achieved by moving working hours towards online guidance between sessions. In a double trainer setting with a group size of eight patients, the expected online guidance for four patients takes around 45 minutes per therapist and week. In this regard, surveyed therapists uniformly emphasised the relevance of reimbursement for online guidance time. Even though this additional workload can easily be compensated by shortening the overall treatment duration [28], such shortenings should be carried out carefully and in accordance with patient needs [87] (e.g. time to establish trust in the group).

bGT takes a special position in the field of internet interventions. Firstly, bGT can be a cost-efficient treatment option situated between guided online interventions and blended individual therapy (Figure 1). Compared to online interventions, bGT preserves real world contact at slightly higher costs. When compared to individual therapy, however, bGT can lead to similar cost savings as known from classical group therapy. Secondly, group phenomena could be harnessed to support therapist efforts to promote compliance with online tasks [42, 90]. Compared to online interventions, which sometimes suffer from low adherence rates [15, 92], patients engaged to a wide extend in the featured online tasks, as results indicate comparable adherence to group sessions and technology-based elements. Thirdly, bGT blurs distinctions

between individual and group therapy, as it brings a high degree of individualized care to the group format. For example, it opens new ways for intimate patient-to-therapist communication, and it routinely provides therapists with individual information on treatment progress or potential problems [74].

Regarding potential disadvantages of bGT, therapists mentioned that certain participants might feel overwhelmed by the close monitoring of between-session activities, or by the number of set reminders. For this reason, the intensity of monitoring and online activities should be adaptable to patient needs. As a second aspect, two therapists expressed concerns about data safety. These concerns should be treated with high priority to prevent therapists from being deterred. Thirdly, extensive in-session media use was described as a risk factor, potentially dampening desired group dynamics. Although observable incidences were reported less frequently (*Table 5*), bGT interventions can profit from a cautious implementation of in-session technology. Fourthly, some therapists stated that it might be more difficult to attract experienced or less interested therapists. Thus, incentives seem important to make bGT a workable approach (e.g. reimbursement of online guidance time, flexibility of working hours, and balance of work tasks). As a last aspect, one therapist mentioned the limited management of acute crisis, which theoretically might be induced by online elements or between-session tasks. Here, technology can provide new ways of emergency management too. For example, by the installation of an emergency button, as seen in a blended app-supported problem solving treatment for patients with intentional self-harm [93].

This study has several noteworthy strengths and limitations. Firstly, this article adds a first therapist-related perspective to previous findings on bGT [37-42]. Secondly, it applies a multimodal research strategy (e.g. triangulation of quantitative and qualitative methods, and implementation of log data) in order to investigate feasibility in a more holistic way. Thirdly,

in accordance with recommendations on the documented use of technology [91], the present study provides detailed and objectively measured information on online and mobile app completion rates. Fourthly, compared to prior bGT depression studies [40, 41], and studies on online interventions [94, 95], the current sample composition is more balanced with respect to gender and the level of education. Finally, the study reports deterioration rates and possible risks associated with the novel format.

Amongst its most important limitations, this study was designed and powered to investigate the feasibility of bGT for depression. The study design therefore does not allow any conclusions about technology-induced increases in efficiency or effectiveness. Together with blended individual therapy trials [29, 30], future research will have to determine the merits of bGT in terms of augmented treatment effects. Secondly, many different constellations of blended therapy exist and heterogeneity within the field is high [23]. At hand findings primarily represent the more integrated forms of blended therapy, while less integrated forms (e.g. adjunct online programs) may differ in therapist's guidance, the flexibility of treatment or the intensity of treatment. In this context, bGT concepts for group psychotherapy (> 15 – 20 sessions), as well as blends of internet interventions with tele-group therapy [96, 97], and discontinuous groups should be developed. Thirdly, even though conducted in an outpatient clinic, the study setting restricts generalizability, as groups were held at an affiliated university centre for psychotherapy and counselling, and the sample was self-selected. Therefore, it is probable that clients were more interested in this kind of treatment. Furthermore, the treatment was carried out by novice therapists. While some study aspects appear less prone to introducing bias (i.e. online guidance time or log files), it is likely that novice therapists are more adaptable to innovations. More ample evaluations of therapist views exist in neighbouring fields, such as individual blended therapy, tele therapy and online therapy [16, 31, 96, 97].

## **Conclusion**

This study adds a first therapist perspective to previous research on bGT. Feasibility was supported within a university outpatient setting, treating a demographically balanced sample with a short, but intense ACT-based group intervention. Even though the intervention entailed a variety of online and app-based elements, the amount of online guidance was manageable, and guidance resulted in more flexible working hours. The online platform was appreciated for the implementation of between-session monitoring and the establishment of the therapeutic alliance. Compliance with CBT tasks can be fostered by prompts via the online platform, resulting in high adherence rates. Potential negative effects of blending should to be regarded in the design and implementation of bGT interventions.

## **Conflicts of interest**

None of the authors has, or has had, any financial, personal or other relationship with people or organisations that would interfere with the interpretation and presentation of this study's findings.

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## Appendix

### Interview guide; Interview follow-up survey

#### Literature

1. Vigo, D., Thornicroft, G., & Atun, R. (2016). Estimating the true global burden of mental illness. *The Lancet Psychiatry*, 3(2), 171-178.
2. Tomlinson, M., Rudan, I., Saxena, S., Swartz, L., Tsai, A. C., & Patel, V. (2009). Setting priorities for global mental health research. *Bulletin of the World Health Organization*, 87(6), 438-446.
3. Wykes, T., Haro, J. M., Belli, S. R., Obradors-Tarragó, C., Arango, C., Ayuso-Mateos, J. L., . . . & Elfeddali, I. (2015). Mental health research priorities for Europe. *The Lancet Psychiatry*, 2(11), 1036-1042.
4. Andersson, G. (2016). Internet-delivered psychological treatments. *Annual Review of Clinical Psychology*, 12, 157-179.
5. Cuijpers, P., Riper, H., & Andersson, G. (2015). Internet-based treatment of depression. *Current Opinion in Psychology*, 4, 131-135.
6. Păsărelu, C. R., Andersson, G., Nordgren, L. B., & Doborean, A. (2016). Internet-delivered transdiagnostic and tailored cognitive behavioral therapy for anxiety and depression: a systematic review and metaanalysis of randomized controlled trials. *Cognitive Behaviour Therapy*, 46(1), 1-28.
7. Königsbauer, J., Letsch, J., Ebner, P., Ebert, D., & Baumeister, H. (2017). Internet-and mobile-based depression interventions for people with diagnosed depression: a systematic review and meta-analysis. *Journal of affective disorders*, 223, 28-40.
8. Rathbone, A. L., Clarry, L., & Prescott, J. (2017). Assessing the efficacy of mobile health apps using the basic principles of cognitive behavioral therapy: Systematic review. *Journal of medical Internet research*, 19(11).
9. Andersson, G., & Titov, N. (2014). Advantages and limitations of Internet-based interventions for common mental disorders. *World Psychiatry*, 13(1), 4-11.
10. Emmelkamp, P. M., David, D., Beckers, T., Muris, P., Cuijpers, P., Lutz, W., . . . & Vervliet, B. (2013). Advancing psychotherapy and evidence-based psychological interventions. *International Journal of Methods in Psychiatric Research*, 23(1), 58-91.
11. Titov, N., Dear, B. F., Staples, L. G., Bennett-Levy, J., Klein, B., Rapee, R. M., . . . & Nielssen, O. B. (2015). MindSpot Clinic: An Accessible, Efficient, and Effective Online Treatment Service for Anxiety and Depression. *Psychiatric Services*, 66(10), 1043-1050.
12. Hedman, E., Ljótsson, B., Kald, V., Hesser, H., Alaoui, S. E., Kraepelien, M., . . . & Lindefors, N. (2014). Effectiveness of Internet-based cognitive behaviour therapy for depression in routine psychiatric care. *Journal of Affective Disorders*, 155, 49-58.
13. Titov, N., Dear, B., Nielssen, O., Staples, L., Hadjistavropoulos, H., Nugent, M., . . . & Repål, A. (2018). ICBT in routine care: A descriptive analysis of successful clinics in five countries. *Internet Interventions*.
14. Johansson, R., & Andersson, G. (2012). Internet-based psychological treatments for depression. *Expert review of neurotherapeutics*, 12(7), 861-870.
15. Richards, D., & Richardson, T. (2012). Computer-based psychological treatments for depression: a systematic review and meta-analysis. *Clinical psychology review*, 32(4), 329-342.
16. Schuster, R., Pokorny, R., Topooco, N., Berger, T., & Laireiter, A.-R. (2018). Advantages and disadvantages of online and blended therapy: Attitudes towards both interventions amongst licensed psychotherapists in Austria. *JMIR*.
17. Topooco, N., Riper, H., Araya, R., Berking, M., Brunn, M., Chevreul, K., . . . & Kleiboer, A. (2017). Attitudes towards digital treatment for depression: A European stakeholder survey. *Internet Interventions*, 8, 1-9.
18. Ly, K. H., Trüschel, A., Jarl, L., Magnusson, S., Windahl, T., Johansson, R., . . . & Andersson, G. (2014). Behavioural activation versus mindfulness-based guided self-help treatment administered through a smartphone application: a randomised controlled trial. *BMJ open*, 4(1), e003440.
19. Ly, K. H., Janni, E., Wrede, R., Sedem, M., Donker, T., Carlbring, P., & Andersson, G. (2015). Experiences of a guided smartphone-based behavioral activation therapy for depression: a qualitative study. *Internet Interventions*, 2(1), 60-68.



20. Nahum, M., Van Vleet, T. M., Sohal, V. S., Mirzabekov, J. J., Rao, V. R., Wallace, D. L., ... & Biagiante, B. (2017). Immediate Mood Scaler: Tracking Symptoms of Depression and Anxiety Using a Novel Mobile Mood Scale. *JMIR mHealth and uHealth*, 5(4).
21. Shen, N., Levitan, M. J., Johnson, A., Bender, J. L., Hamilton-Page, M., Jadad, A. A. R., & Wiljer, D. (2015). Finding a depression app: a review and content analysis of the depression app marketplace. *JMIR mHealth and uHealth*, 3(1).
22. Krieger, T., Meyer, B., Sude, K., Urech, A., Maercker, A., & Berger, T. (2014). Evaluating an e-mental health program ("deprexis") as adjunctive treatment tool in psychotherapy for depression: design of a pragmatic randomized controlled trial. *BMC psychiatry*, 14(1), 285.
23. Erbe, D., Eichert, H. C., Riper, H., & Ebert, D. D. (2017). Blending Face-to-Face and Internet-Based Interventions for the Treatment of Mental Disorders in Adults: Systematic Review. *Journal of medical Internet research*, 19(9).
24. Ebert, D., Tarnowski, T., Gollwitzer, M., Sieland, B., & Berking, M. (2013). A transdiagnostic internet-based maintenance treatment enhances the stability of outcome after inpatient cognitive behavioral therapy: a randomized controlled trial. *Psychotherapy and psychosomatics*, 82(4), 246-256.
25. Kleiboer, A., Smit, J., Bosmans, J., Ruwaard, J., Andersson, G., Topooco, N., . . . & Chevreur, K. (2016). European COMPARative Effectiveness research on blended Depression treatment versus treatment-as-usual (E-COMPARED): study protocol for a randomized controlled, non-inferiority trial in eight European countries. *Trials*, 17(1), 387.
26. Ly, K. H., Topooco, N., Cederlund, H., Wallin, A., Bergström, J., Molander, O., ... & Andersson, G. (2015). Smartphone-supported versus full behavioural activation for depression: a randomised controlled trial. *PLoS One*, 10(5), e0126559.
27. Urech, A., Krieger, T., Möseneder, L., Biaggi, A., Vincent, A., Poppe, C., . . . & Berger, T. (2018). A patient post hoc perspective on advantages and disadvantages of blended cognitive behaviour therapy for depression: A qualitative content analysis. *Psychotherapy Research*, 1-13.
28. Thase, M. E., Wright, J. H., Eells, T. D., Barrett, M. S., Wisniewski, S. R., Balasubramani, G. K., . . . & Brown, G. K. (2017). Improving the efficiency of psychotherapy for depression: computer-assisted versus standard CBT. *American Journal of Psychiatry*, 175(3), 242-250.
29. Berger, T., Krieger, T., Sude, K., Meyer, B., & Maercker, A. (2017). Evaluating an e-mental health program ("deprexis") as adjunctive treatment tool in psychotherapy for depression: Results of a pragmatic randomized controlled trial. *Journal of affective disorders*, 227, 455-462.
30. Zwerenz, R., Becker, J., Knickenberg, R. J., Siepmann, M., Hagen, K., & Beutel, M. E. (2017). Online self-help as an add-on to inpatient psychotherapy: Efficacy of a new blended treatment approach. *Psychotherapy and psychosomatics*, 86(6), 341-350.
31. Titzler, I., Saruhanjan, K., Berking, M., Riper, H., & Ebert, D. D. (2018). Barriers and facilitators for the implementation of blended psychotherapy for depression: A qualitative pilot study of therapists' perspective. *Internet Interventions*.
32. van der Vaart, R. V., Witting, M., Riper, H., Kooistra, L., Bohlmeijer, E. T., & Gemert-Pijnen, L. J. (2014). Blending online therapy into regular face-to-face therapy for depression: content, ratio and preconditions according to patients and therapists using a Delphi study. *BMC Psychiatry*, 14(1), 355.
33. DeLucia-Waack, J. L., Kalodner, C. R., & Riva, M. (Eds.). (2013). *Handbook of group counseling and psychotherapy*. London, UK: Sage Publications.
34. Conyne, R. K. (Ed.). (2010). *The Oxford handbook of group counseling*. Oxford, UK: Oxford University Press.
35. Przeworski, A., & Newman, M. G. (2004). Palmtop computer-assisted group therapy for social phobia. *Journal of Clinical Psychology*, 60, 179 – 188.
36. Gruber, K., Moran, P. J., Roth, W. T. & Taylor, C. B. (2002). Computer-assisted cognitive behavioral group therapy for social phobia. *Behavior Therapy*, 32, 155-165.
37. Newman, M. G., Przeworski, A., Consoli, A. J., & Taylor, C. B. (2014). A randomized controlled trial of ecological momentary intervention plus brief group therapy for generalized anxiety disorder. *Psychotherapy*, 51(2), 198-206.
38. Samaan, Z., Dennis, B. B., Kalbfleisch, L., Bami, H., Zielinski, L., Bawor, M., . . . & O'Neill, L. (2016). Behavioral activation group therapy for reducing depressive symptoms and improving quality of life: a feasibility study. *Pilot and feasibility studies*, 2(1), 22.
39. Aguilera, A., Bruehlman-Senecal, E., Demasi, O., & Avila, P. (2017). Automated Text Messaging as an Adjunct to Cognitive Behavioral Therapy for Depression: A Clinical Trial. *Journal of medical Internet research*, 19(5), e148.
40. Schuster, R., Leitner, I., Carlbring, P., & Laireiter, A. R. (2017). Exploring blended group interventions for depression: randomised controlled feasibility study of a blended computer-and multimedia-supported psychoeducational group intervention for adults with depressive symptoms. *Internet Interventions*, 8, 63-71.

41. Schuster, R., Fichtenbauer, I., Sparr, V., Berger, T., & Laireiter, A.-R. (2018a). Feasibility of a blended group intervention (bGT) for major depression: Uncontrolled interventional study in a university setting. *BMJ Open*, e018412.
42. Schuster, R., Sigl, S., Berger, T., & Laireiter, A.R. (2018b). Patients' Experiences of blended Group Therapy for Depression: Fit and Implications for the Group Setting. *JMIR Mental Health*.
43. Hayes, S. C. (2016). Acceptance and Commitment Therapy, Relational Frame Theory, and the Third Wave of Behavioral and Cognitive Therapies—Republished Article. *Behavior therapy*, 47(6), 869-885.
44. Lejuez, C. W., Hopko, D. R., Acierno, R., Daughters, S. B., & Pagoto, S. L. (2011). Ten year revision of the brief behavioral activation treatment for depression: revised treatment manual. *Behavior modification*, 35(2), 111-161.
45. Hautzinger, M., & Bailer, M. (1993). Allgemeine Depressions Skala (ADS). Manual. Weinheim, Germany: Beltz.
46. Hautzinger, M., Bailer, M., Hofmeister, D., & Keller, F. (2012). *Allgemeine Depressionsskala. Manual* (2nd ed.). Göttingen, Germany: Hogrefe.
47. Margraf, J. (2013). Mini-DIPS: Diagnostisches Kurz-Interview bei psychischen Störungen. Berlin, Germany: Springer.
48. Margraf, J., Schneider, S., Ehlers, A., DiNardo, P., & Barlow, D. (2013). DIPS Diagnostisches Interview bei psychischen Störungen: Interviewleitfaden. Berlin, Germany: Springer.
49. Kanter, J.W., Baruch, D.E. & Gaynor, S.T., 2006. Acceptance and Commitment Therapy and Behavioral Activation for the Treatment of Depression: Description and Comparison. *The Behavior Analyst*, 29(2), 161–185.
50. Mazzucchelli, T., Kane, R., & Rees, C. (2009). Behavioral activation treatments for depression in adults: a meta-analysis and review. *Clinical Psychology: Science and Practice*, 16(4), 383-411.
51. Carlbring, P., Hägglund, M., Luthström, A., Dahlin, M., Kadowaki, Å., Vernmark, K., & Andersson, G. (2013). Internet-based behavioral activation and acceptance-based treatment for depression: a randomized controlled trial. *Journal of Affective Disorders*, 148(2), 331-337.
52. Harris, R. (2014). Schwierige Situationen in der Akzeptanz- und Commitmenttherapie (ACT). Germany: Belz.
53. Zettle, R. (2007). ACT for depression: A clinician's guide to using acceptance and commitment therapy in treating depression. Oakland, CA: New Harbinger Publications.
54. Lehr, D., Hillert, A., Schmitz, E., Sosnowsky, N., (2008). Screening depressiver Störungen mittels Allgemeiner Depressions-Skala (ADS-K) und State-Trait Depressions Scales (STDS). *Diagnostica* 544, 61–70.
55. Goldberg, D. P., & Williams, P. A. (1988). A users's guide to the General Health Questionnaire. Windsor, UK: NFER-Nelson.
56. Goldberg, D. P., Gater, R., Sartorius, N., Ustun, T. B., Piccinelli, M., Gureje, O., & Rutter, C. (1997). The validity of two versions of the GHQ in the WHO study of mental illness in general health care. *Psychological Medicine*, 27(1), 191-197.
57. Scharnitz, N., Kruse, J., & Tress, W. (1999). Psychometric properties of the General Health Questionnaire (GHQ-12) in a German primary care sample. *Acta psychiatrica Scandinavica*, 100(6), 462-468.
58. Hoyer, J., & Gloster, A. T. (2013). Psychologische Flexibilität messen: Der Fragebogen zu Akzeptanz und Handeln II. *Verhaltenstherapie*, 23(1), 42-44.
59. Bond, F. W., Hayes, S. C., Baer, R. A., Carpenter, K. M., Guenole, N., Orcutt, H. K., . . . & Zettle, R. D. (2011). Preliminary psychometric properties of the Acceptance and Action Questionnaire–II: A revised measure of psychological inflexibility and experiential avoidance. *Behavior therapy*, 42(4), 676-688.
60. Wells, A. (1994). A multi-dimensional measure of worry: Development and preliminary validation of the Anxious Thoughts Inventory. *Anxiety, Stress and Coping*, 6(4), 289-299.
61. Hoyer, J. & Rebstock, U. (1996). AnTI - Anxious Thoughts Inventory - deutsche Fassung. PSYNDEX Tests Info. Frankfurt, DE: Universität Frankfurt.
62. Berle, D., Starcevic, V., Moses, K., Hannan, A., Milicevic, D., & Sammut, P. (2011). Preliminary validation of an ultra-brief version of the Penn State Worry Questionnaire. *Clinical psychology & psychotherapy*, 18(4), 339-346.
63. Meyer, T. J., Miller, M. L., Metzger, R. L., & Borkovec, T. D. (1990). Development and validation of the penn state worry questionnaire. *Behaviour research and therapy*, 28(6), 487-495.
64. Brooke, J. (1996). SUS: A "quick and dirty" usability scale. In P. W. Jordan, B. Thomas, B. A. Weerdmeester, & I. L. McClelland (Eds.) *Usability Evaluation in Industry* (pp. 189-194). London, UK: Taylor.
65. Bangor, A., Kortum, P., & Miller, J. (2009). Determining what individual SUS scores mean: Adding an adjective rating scale. *Journal of usability studies*, 4(3), 114-123.

66. Schmidt, J., Lamprecht, F., & Wittmann, W. W. (1989). Zufriedenheit mit der stationären Versorgung. Entwicklung eines Fragebogens und erste Validitätsuntersuchungen. *Psychotherapie, Psychosomatik, Medizinische Psychologie*, 39, 248-255.
67. Attkisson, C. C., & Zwick, R. (1982). The Client Satisfaction Questionnaire: Psychometric properties and correlations with service utilization and psychotherapy outcome. *Evaluation and program planning*, 5(3), 233-237.
68. Hannöver, W., Dogs, C. P., & Kordy, H. (2000). Patientenzufriedenheit—ein Maß für Behandlungserfolg?. *Psychotherapeut*, 45(5), 292-300.
69. Jacobson, N. S., & Turax, P. (1991). Clinical significance: a statistical approach to defining meaningful change in psychotherapy research. *Journal of consulting and clinical psychology*, 59, 12-19.
70. Lambert, M. J., & Ogles, B. M. (2009). Using clinical significance in psychotherapy outcome research: the need for a common procedure and validity data. *Psychotherapy Research*, 19(4), 493-501.
71. Cohen, J. (1988). Statistical power analysis for the behavioral sciences (2nd ed.). Hillsdale, NJ.: Lawrence Erlbaum Associates.
72. Faul, F., Erdfelder, E., Lang, A. G., & Buchner, A. (2007). G\*Power 3: a flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, 39, 175-191.
73. Mayring, P. (2018, January). Qualitative content analysis: theoretical foundation, basic procedures and software solution. Retrieved from <http://nbn-resolving.de/urn:nbn:de:0168-ssolar-395173>
74. Burlingame, G. M. & Beecher, M. E. (2018). Therapeutic relationship and outcome feedback in group treatment.
75. Burlingame, G. M., Fuhrman, A., & Mosier, J. (2003). The differential effectiveness of group psychotherapy: A meta-analytic perspective. *Group Dynamics: Theory, Research, and Practice*, 7(1), 3.
76. Burlingame, G. M., Seebeck, J. D., Janis, R. A., Whitcomb, K. E., Barkowski, S., Rosendahl, J., & Strauss, B. (2016). Outcome differences between individual and group formats when identical and nonidentical treatments, patients, and doses are compared: A 25-year meta-analytic perspective. *Psychotherapy*, 53(4), 446.
77. McDermut, W., Miller, I. W., & Brown, R. A. (2001). The efficacy of group psychotherapy for depression: A meta-analysis and review of the empirical research. *Clinical Psychology: Science and Practice*, 8(1), 98-116.
78. Delgadillo, J., Kellett, S., Ali, S., McMillan, D., Barkham, M., Saxon, D., . . . & Thwaites, R. (2016). A multiservice practice research network study of large group psychoeducational cognitive behavioural therapy. *Behaviour research and therapy*, 87, 155-161.
79. Thimm, J. C., & Antonsen, L. (2014). Effectiveness of cognitive behavioral group therapy for depression in routine practice. *BMC psychiatry*, 14(1), 292.
80. Bengtsson, J., Nordin, S., & Carlbring, P. (2015). Therapists' experiences of conducting cognitive behavioural therapy online vis-à-vis face-to-face. *Cognitive behaviour therapy*, 44(6), 470-479.
81. Paxling, B., Lundgren, S., Norman, A., Almlöv, J., Carlbring, P., Cuijpers, P., & Andersson, G. (2013). Therapist behaviours in internet-delivered cognitive behaviour therapy: analyses of e-mail correspondence in the treatment of generalized anxiety disorder. *Behavioural and cognitive psychotherapy*, 41(3), 280-289.
82. Schröder, J., Berger, T., Meyer, B., Lutz, W., Hautzinger, M., Späth, C., . . . & Moritz, S. (2017). Attitudes towards internet interventions among psychotherapists and individuals with mild to moderate depression symptoms. *Cognitive Therapy and Research*, 41(5), 745-756.
83. Månsson, K. N., Klintmalm, H., Nordqvist, R., & Andersson, G. (2017). Conventional Cognitive Behavioral Therapy Facilitated by an Internet-Based Support System: Feasibility Study at a Psychiatric Outpatient Clinic. *JMIR research protocols*, 6(8).
84. Kaiser, T., Schmutzhart, L., & Laireiter, A. R. (2018). Attitudes of Austrian psychotherapists towards process and outcome monitoring. *Adm Policy Ment Health*.
85. Kenter, R. M., van de Ven, P. M., Cuijpers, P., Koole, G., Niamat, S., Gerrits, R. S., . . . & van Straten, A. (2015). Costs and effects of Internet cognitive behavioral treatment blended with face-to-face treatment: results from a naturalistic study. *Internet Interventions*, 2(1), 77-83.
86. Suler, J. (2004). The online disinhibition effect. *Cyberpsychology & behavior*, 7(3), 321-326.
87. Ruwaard, J., & Kok, R. (2015). Wild West eHealth: Time to hold our horses?. *European Health Psychologist*, 17(1), 45-49.
88. Bauer, S., Wolf, M., Haug, S., & Kordy, H. (2011). The effectiveness of internet chat groups in relapse prevention after inpatient psychotherapy. *Psychotherapy Research*, 21(2), 219-226.
89. Nordh, M., Vigerland, S., Öst, L. G., Ljótsson, B., Mataix-Cols, D., Serlachius, E., & Högström, J. (2017). Therapist-guided internet-delivered cognitive-behavioural therapy supplemented with group exposure sessions for adolescents with social anxiety disorder: a feasibility trial. *BMJ open*, 7(12), e018345.

90. Ivanov, V. Z., Enander, J., Mataix-Cols, D., Serlachius, E., Månsson, K. N., Andersson, G., . . . & Rück, C. (2018). Enhancing group cognitive-behavioral therapy for hoarding disorder with between-session Internet-based clinician support: A feasibility study. *Journal of Clinical Psychology*.
91. Sieverink, F., Kelders, S. M., & van Gemert-Pijnen, J. E. (2017). Clarifying the Concept of Adherence to eHealth Technology: Systematic Review on When Usage Becomes Adherence. *Journal of medical Internet research*, 19(12), e402.
92. Christensen, H., Griffiths, K. M., & Farrer, L. (2009). Adherence in internet interventions for anxiety and depression: systematic review. *Journal of medical Internet research*, 11(2), e13.
93. Mackie, C., Dunn, N., MacLean, S., Testa, V., Heisel, M., & Hatcher, S. (2017). A qualitative study of a blended therapy using problem solving therapy with a customised smartphone app in men who present to hospital with intentional self-harm. *Evidence-based mental health*, 20(4), 118-122.
94. Lindner, P., Nyström, M. B., Hassmén, P., Andersson, G., & Carlbring, P. (2015). Who seeks ICBT for depression and how do they get there? Effects of recruitment source on patient demographics and clinical characteristics. *Internet Interventions*, 2(2), 221-225.
95. Klein, J. P., Gamon, C., Späth, C., Berger, T., Meyer, B., Hohagen, F., . . . & Schröder, J. (2017). Does recruitment source moderate treatment effectiveness? A subgroup analysis from the EVIDENT study, a randomised controlled trial of an internet intervention for depressive symptoms. *BMJ open*, 7(7), e015391.
96. Greene, C. J., Morland, L. A., Macdonald, A., Frueh, B. C., Grubbs, K. M., & Rosen, C. S. (2010). How does tele-mental health affect group therapy process? Secondary analysis of a noninferiority trial. *Journal of Consulting and Clinical Psychology*, 78(5), 746.
97. Marton, K., & Kanas, N. (2016). Telehealth Modalities for Group Therapy: Comparisons to In-Person Group Therapy. *International Journal of Group Psychotherapy*, 66(1), 145-150.

Figure 1. Blends of online and face-to-face therapy

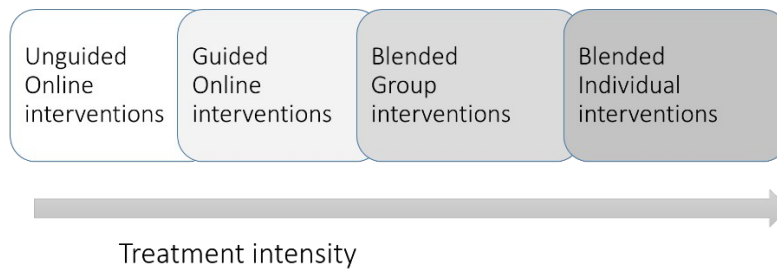


Table 1. Group sessions and computer and multimedia elements of the intervention.

Week	Online Module	Group Session	App	Workbook
1	Introduction into mindfulness	Introduction into ACT, mindfulness	Feature 1: Mindfulness in daily life	- List of mindful activities
2	Natural suffering and suffering through avoidance	Avoidance and acceptance	Feature 2: Acceptance	- Acceptance of a difficult situation, topic, character trait or conflict - Reflection on mindfulness
3	Defusion	Fusion and defusion	Feature 3: Defusion	- Typical examples of defusion
4	Values, goals, self-management	Values, mastery, self-management	Feature 4: Mastery activities	- Bullseye Exercise - Example and sheet for SMART-principle - Activity planning
5	Commitment	Commitment and positive reinforcement	Feature 5a: "Do activities" Feature 5b: "Do not activities"	- Determination, ranking and planning of do- and do not activities - Self-management - Activity planning
6	Expansion of behavioral activation	Expansion of behavioral activation	Continuation of previous features of the app	- Contracts
7	Review and transfer	Transfer & conclusion	Continuation of previous features of the app	- Plan for relapse

Figure 2. Study flow chart

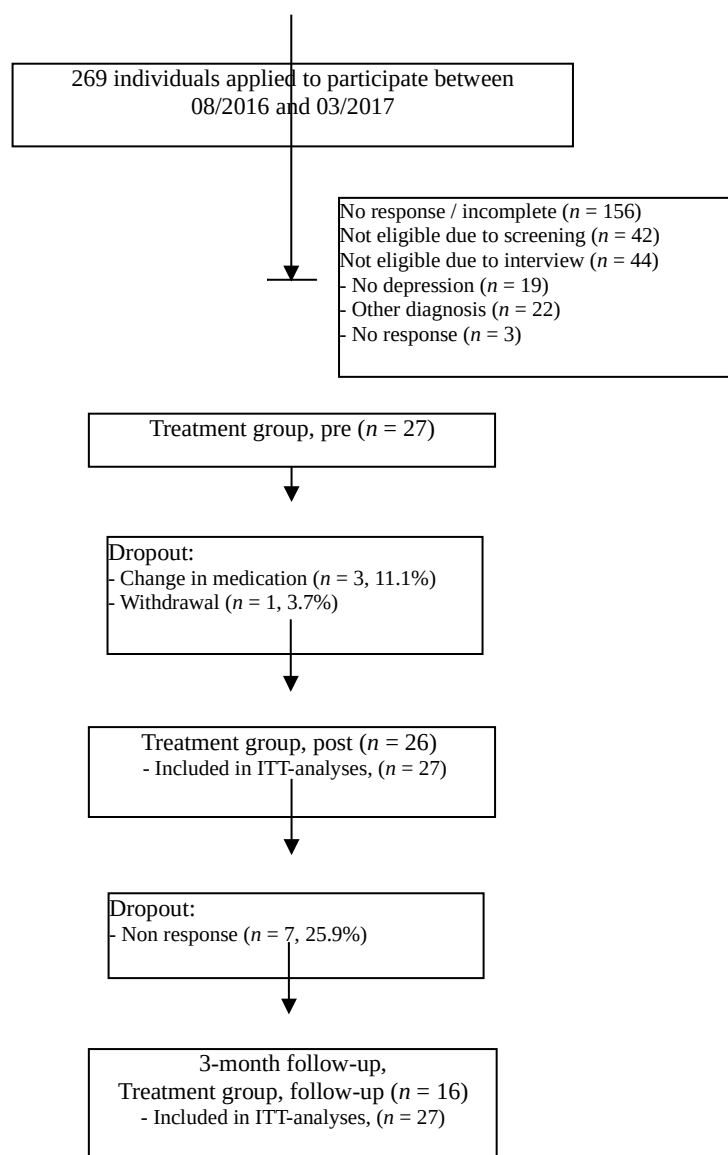
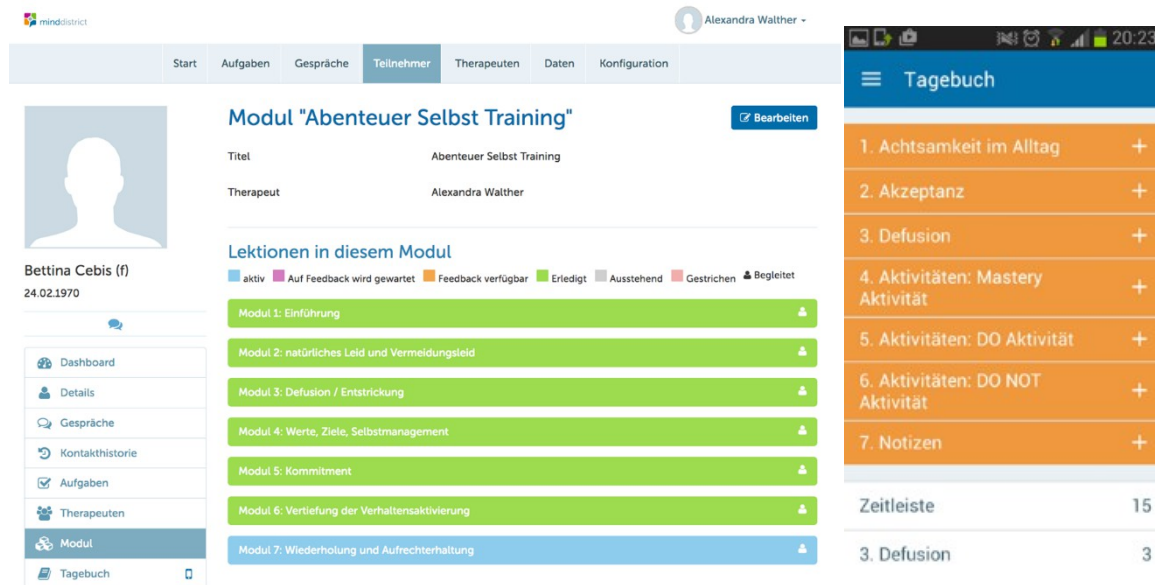


Figure 3. User interfaces of the online platform and the smart phone application



Characteristic	Mean (SD) or n (%)
Age, mean (SD)	37.70 (13.66)
Gender, female, n (%)	14 (51.9)
Education, n (%)	
≥ 9 years (compulsory school)	7 (25.9)
≥ 12 years (A level)	12 (44.4)
≥ any tertiary education (e.g. university)	8 (29.6)
Employment, n (%)	
- full time	11 (40.7)
- part time	6 (22.2)
- none / marginally	5 (18.5)
- currently in education	5 (18.5)
Current psychopharmacological treatment, n (%)	3 (12)
Prior psychotherapeutic treatment, n (%)	14 (54)
Computer experience, n (%)	
Daily use	25 (92.6)
Weekly use	2 (7.4)
F32.0 (mild depressive episode)	3 (11.1)
F32.1 (moderate depressive episode)	8 (29.6)
F33.0 (recurrent depressive episode, current episode mild)	10 (37.0)
F33.1 (recurrent depressive episode, current episode moderate)	4 (14.8)
F33.4 (recurrent depressive disorder, in remission – elevated levels of depression)	2 (7.4)
<b>Comorbidities</b>	
F10.1/2 (harmful use of alcohol/addiction)	1 (3.7)
F40.0 (agoraphobia without panic disorder)	1 (3.7)
F40.1 (social phobia)	2 (7.4)
F40.2 (specific phobia)	1 (3.7)
F41.1 (generalized anxiety disorder)	3 (11.1)
F43.2 (adjustment disorder)	1 (3.7)
F50.2 (bulimia nervosa)	1 (3.7)

Table 3. Means, standard deviations, effect sizes (Cohen's d) and reliable change for primary and secondary outcomes.

	N	Estimated means (SD)			Effect sizes (estimated means) Pre- to post effect size	Reliable change	
		Pre	Post	Follow-up		Pre- to post RCI	Pre- to follow-up RCI
CES-D	27	22.44	13.56 (6.48)	12.19 (7.94)	1.51	74	78

		(5.18)			[0.89 – 2.09]		
GHQ-12	27	16.07 (5.41)	9.63 (4.39)	11.94 (7.12)	1.31 [0.70 – 1.87]	63	52
AAQ-II	27	26.15 (8.87)	20.71 (8.85)	18.63 (9.71)	0.59 [0.02 – 1.14]	--	--
AnTi	27	44.33 (10.22)	36.46 (10.45)	36.25 (11.59)	0.72 [0.14 – 1.27]	--	--
PSWQ-3	27	7.63 (2.50)	6.67 (2.76)	6.50 (2.97)	0.37 [-0.19 – 0.91]	--	--

*Note.* Standard deviations are shown in round parentheses and 95 % confidence intervals are shown in square parentheses. CES-D: Center for Epidemiological Studies-Depression scale; GHQ-12: General Health Questionnaire (12-item version); AAQ-II: Acceptance and Actions Questionnaire; AnTi: Anxious Thoughts Inventory; PSWQ-3: Penn State Worry Questionnaire (ultra-short version); RCI = reliable change index.

Table 4. Main themes, sub-themes, and frequent codes of therapist interviews

Main theme	Sub-theme	Frequent codes
Advantages	Patients	Content repeatable; greater learning effect; increased engagement with therapy tasks
	Therapists	Additional information through monitoring; helpful for younger therapists; guiding thread
	Interaction	Patients more open (online disinhibition); building relationship through intimate online communication
Disadvantages	General	Additional effort; data security; limited management of acute crisis; predefined treatment course
	Specific	Effects on group climate and cohesion; sessions overloaded
General evaluation	Positive	Contemporary; suitable for stationary settings; improved handling with increased routine
	Negative	Preference towards classic therapy; more training than therapy; technical issues; initial scepticism
Online communication	Online reminders	Require organized working style; increase compliance; unwanted effects
	Online feedback	Important feature; needs to be short in duration
Patients differences	Optional classic treatment path	Adaptation to patient preferences; possible side effects
	Differences in patients	Not for severe depression; amount of required guidance time; depends on media-affinity; requires openness and compliance

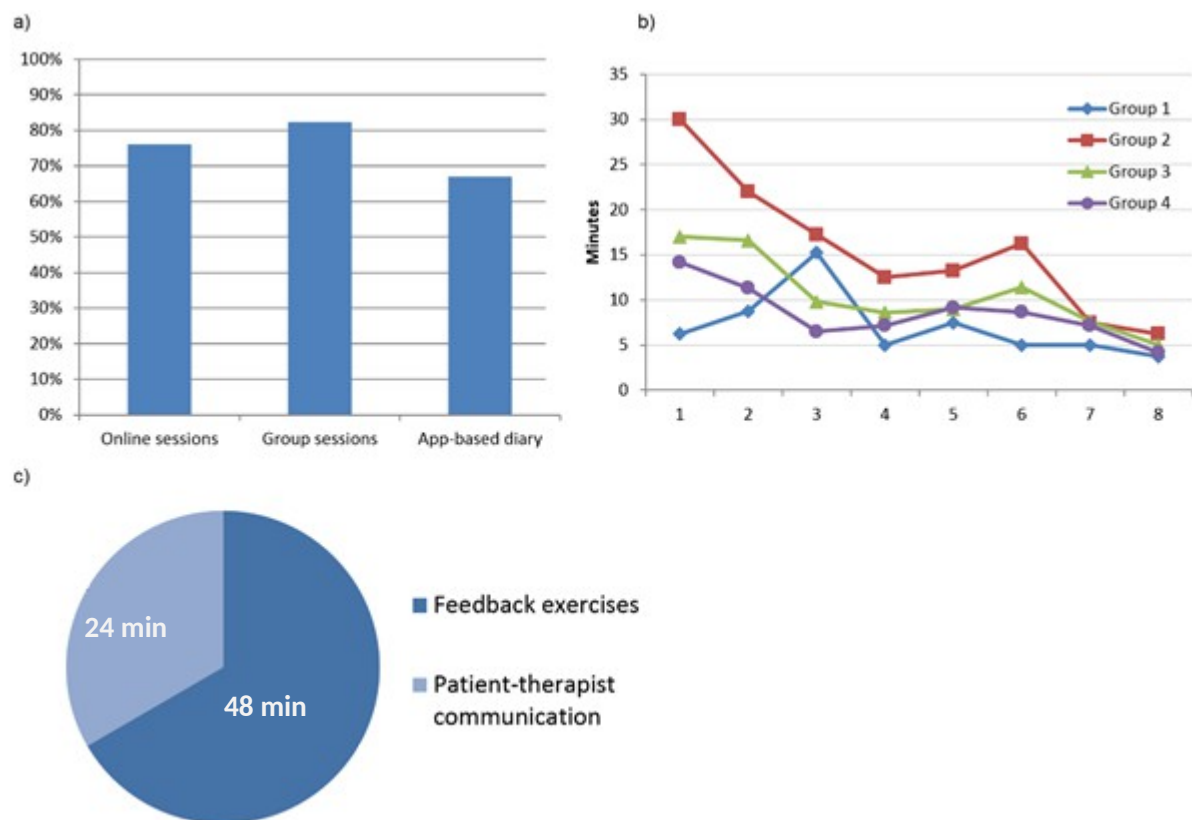


Table 5. Benefits and drawbacks of bGT according to interview follow-up survey (n = 8).

Statement*	(rather) agree %	(rather) disagree %	Mean (SD)
I am more open after experience with bGT *	25 (75)	0	3.25 (0.46)
I am more critical after experience with bGT *	0	13 (88)	1.86 (0.36)
I have serious concerns about data safety *	0 (25)	25 (50)	2.00 (0.76)
bGT may also be feasible for in-patient treatment *	13 (75)	0 (13)	3 (0.53)
Advantage of more flexible working hours due to online guidance *	50 (38)	13 (0)	3.25 (1.03)
CE <sup>1</sup> should be used for in-session support *	50 (25)	0 (25)	3.25 (0.89)
Overuse of in-session media can hamper group dynamics *	50 (38)	0 (13)	3.38 (0.75)
Overuse of in-session media did hamper dynamics in my groups *	0 (25)	50 (25)	1.75 (0.87)
CE <sup>2</sup> should be used for between-session support (%) *	63 (38)	0	3.63 (0.52)
Platform optimally prepares patients for group reunions *	38 (63)	0	3.38 (0.52)
Repeated application of therapy content fosters abilities (CE, app, session) *	38 (63)	0	3.38 (0.52)
Reminders increased compliance with online tasks *	13 (75)	0 (13)	3.00 (0.53)
bGT cannot increase treatment transfer *	0 (13)	38 (50)	1.75 (0.71)
Reminders did exert a lot of pressure on some patients *	13 (50)	0 (38)	2.75 (0.71)
Additional between-session therapist time needs to be reimbursed *	88 (13)	0	3.88 (0.35)
Patients shared additional private concerns over platform (online disinhibition) <sup>a</sup> *	50 (34)	0 (17)	3.33 (0.82)
Between-session contact made me feel more connected with clients <sup>a</sup> *	17 (83)	0	3.17 (0.41)
Between-session contact does not promote relationship with client <sup>a</sup> *	0	33 (67)	1.67 (0.52)

Note: CE<sup>1</sup> = computer elements (Slides, Videos), CE<sup>2</sup> = computer elements (platform, app, monitoring), \* exact wording is provided in Appendix B, <sup>a</sup> optional questions only applied to 6 therapists

Figure 4. Patients' completion rates of treatment elements, therapist time required for online guidance, and activities during online guidance.



Note: a) Patients' completion rates of intervention elements, b) Therapists' weekly online guidance by single group, c) Therapists' average feedback time per patient during entire treatment